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The Graphic Arts Industry in Mexico - Training and Educational Aspects

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by

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ABSTRACT

THE GRAPHIC ARTS INDUSTRY IN MEXICO -
TRAINING AND EDUCATIONAL ASPECTS

Purpose of the Study: The general purpose of the study was to identify the training/educational needs existing in the graphic arts industry in Mexico and to make an assessment of the present situation and how those needs are being met. Specific purposes were to determine how the existing training/educating plans and programs are dealing with the influx of new technology being imported; to examine the type of new technology being purchased, by which sectors and the reasons for capital and equipment expenditures by these sectors; to analyse what problems are inherent in the acquisition of new technology, mainly in the training and retraining of operating personnel; and to inquire on the need for a centralized technical organization which could serve as a liaison between technological changes occurring in the industry and the adaptation of those changes to the Mexican training/educational environment.

Procedure: For the purposes of this study, the procedures used were within the framework of conventional research methods. Primary sources directly connected with Mexico were obtained through the initial mailing

of questionnaires to Mexican firms and the subsequent field research conducted by personal interviews and obtaining data from governmental and other sources. In addition, surveys of related literature were conducted in the United States through several libraries and government institutions which were consulted for related materials.

Findings: The most important findings were:

1. Training/educating facilities in Mexico for the graphic arts need to be increased. Enlargement and improvement of existing programs were deemed important in preparing the work force.

2. Training of workers in the graphic arts industry has traditionally been done through on-the-job training; this approach continues today.

3. New technology is being acquired throughout the industry. Labor-saving and quality considerations were the main factors in acquisition.

4. Manufacturers/suppliers initial training at the time of installation of new equipment was judged deficient in duration and content.

5. There is an increased need for information exchange regarding new equipment, techniques, procedures, etc.

6. The creation of a centralized technical center and the need for such a center to combine training and technological transfer was deemed necessary by all respondents.

7. Training/capacitating efforts are increasingly being focused on the Law of Capacitation and Training which makes the training of workers compulsory and the full responsibility of the owners.

8. More training efforts must be made to upgrade/update instructors' preparation.

Conclusions: The following conclusions were derived from the study:

1. More in-depth studies are needed to study the effects of technological change on level of skill needed, occupation redundancy and creation, retraining and employment perspectives.

2. Coordination of present training programs should help in preventing duplication of efforts and in meeting capacitating needs more effectively.

3. The problem of appropriate technology remains real to Mexico; its large labor force requires a labor-intensive approach to employment, counter to the present acquisition of new technology.

4. A better general education will be essential for trainees coming into the industry to enable them to cope with fast changes in technology.

5. There is a need for more technical centers for the graphic arts equipped with modern equipment where a theoretical-practical approach can be instituted.

ACKNOWLEDGEMENTS

The completion of this study was greatly facilitated by the assistance and guidance of Mr. Walter Campbell, thesis advisor for this study.

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Chapter 1

INTRODUCTION TO THE STUDY

The Mexican graphic arts industry is undergoing a consistent transformation due to the acquisition of new technology. This acquisition of technology is reflected by the growth of the graphic arts industry in the Mexican economy, with an estimated 12 percent per year from 1979 purchases of US$44.7 million to US$78 million estimated for 1984.[1]

There are several incentives motivating the industry to acquire new equipment, mainly the desire to raise quality and output, but also due to the increased national demand for printed and packaging materials, inflationary trends and labor cost increases.

This modernization and expansion of the industry has not been without related social consequences as are those regarding technological dependence, job creation and lack of a labor force educationally prepared to run the new technology.[2] This lack of skilled workers is one of the critical problems facing the industry and one that is accentuated by the shortage of training centers and technical schools. Most of the existing trade operators have been trained empirically on the job and in "outdated manual methods."[3] This problem is being recognized in Mexico as critical to the efficient growth of the industry and efforts are being made to deal with it. Mexican educators have carried out investigations as far back as 1978 to determine the "development of

technical personnel, the planning of human resources and above all the quality of training."[4] It was determined during these investigations that "the graphic arts worker has been trained within the industry in a very rudimentary manner, with the errors and bad habits of those teaching also acquired by the newcomer; many times this worker is promoted to new positions for which he is not properly trained since his technical background is limited to the knowledge and skills he has acquired through the practice; these promotions are serious mistakes on both the human as well as in the operational level where the results are poor quality and low productivity."[5]

In Mexico, as well as in other developing countries, there is an urgent need and demand for basic skills and specific skills rather than skills that require lengthy school training.[6] This need for skilled workers is now the concern of educators in Mexico and particularly the Mexican Federal Government which in 1978 modified its Ley Federal del Trabajo (Federal Labor Law), specifically Article 123 of said law, which makes capacitation and training of workers the full duty and responsibility of the employer.[7] This law includes the training of all levels of employment within the firm, with capacitation plans and programs for semi-skilled, skilled, craftsmen, technical and supervisory personnel.

Although most training and capacitating in the graphic arts industry will likely center around compliance with the law, other efforts by other groups are simultaneously being made to improve the skill level of the workers in the industry. (1) Representative groups for employers and trade unions which help in defining the content of training and

in the implementation of the same;[8] of particular note in this group are the comisiones mixtas (mixed commissions) which were created as a result of the modifications to the Labor Law and which are composed of owners and workers. (2) Policy bodies of the Mexican Federal Government involved mainly in the implementation of the Law of Capacitation and Training: Secretaría de Trabajo y Previsión Social (Secretariat of Labor and Social Welfare) which has maximum authority in this area; Secretaría de Educación Publica (Secretariat of Public Education); Servicio Nacional del Empleo, Capacitación y Adiestramiento (National Service for Jobs, Capacitation and Training) whose main function is to promote the creation of jobs, supervise the capacitation of workers, and serve as a registering center for the constancias de habilidades laborales (certificates of achievement); Unidad Coordinadora de Capacitación y Adiestramiento/UCECA (Coordinating Unit for Capacitation and Training), an autonomous body under the Secretariat of Labour which "commands, controls, promotes and executes directives toward the implementation of the Law of Capacitation and Training."[9] (3) Advisory, research and liaison bodies aiding in recognizing educational needs, in developing training programs and in coordinating the exchange of information among groups; United Nations organizations like the International Labor Office and United States educational groups like the Graphic Arts Technical Foundation belong to this category. (4) Individual establishments that develop a number of training activities but are usually not officially sanctioned; these are public or private organizations, enterprises, consultants, etc., which take an active part and interest in the industry; manufacturers/suppliers training centers, consultant groups,

mesas redondas, seminars are all present activities affecting training aspects. The situation just described is a complex one with duplication of efforts taking place.

A related problem in Mexico is the training of educational personnel; "who instructs the instructor?" is frequently asked by educational critics. The situation is accurately summarized by saying that "the profound changes in content, duration and methods of training that have had to be introduced to take into account the new needs of the industry have put a special strain on teaching staff. In most cases their knowledge and skills have had to be updated and upgraded for them to be able to implement such changes. The usual method adapted has been to organize training periods in close cooperation with the more advanced printing enterprises and sometimes with manufacturers."[10] Even when upgrading their skills, educators in Mexico are still faced with the problem of too few training facilities and up-to-date equipment;[11] existing training schemes for the graphic arts industry are prepared with contents largely pedagogical and theoretical and the application of theory to actual equipment practice remains undefined.[12]

STATEMENT OF THE PROBLEM

The purpose of this study is to identify the training/educational needs existing in the graphic arts industry in Mexico and to make an assessment of the present situation and how those needs are being met.

More specific purposes were: (1) to determine how the existing training/educating plans and programs are dealing with the influx of new technology; (2) to examine the type of new technology being imported, by which sectors of the industry and the reasons for capital expenditures and purchases of graphic arts equipment by these sectors; (3) to analyse what problems are inherent in the acquisition of new technology, mainly in the training and retraining of operating personnel; (4) to inquire on the need for a centralized technical organization which could serve as a liaison between technological changes occurring in the industry and the adaptation of those changes to the Mexican training/ educational environment.

DEFINITIONS OF TERMS USED

Graphic Arts Industry in Mexico: although official documents in Mexico structure the industry in two major segments, (1) publishing and (2) printing/bindery/allied trades, the following sectors are understood to form part of the industry: newspaper, magazines, books, commercial printing, business forms printing, printing for packaging and service industries for the printing trades (typesetting, photoengraving, electrotyping, stereotyping, lithographic platemaking, scanner service, bindery).

New Technology: the rapid, massive technological change that has taken place worldwide in the last twenty years. The United States space program is considered the early force that set off the information

revolution which resulted in the new and very complex creation of typesetting systems, printing machinery and equipment, materials, work organization and marketing.[13] Silicon chip and laser technology continue this movement: (1) in typesetting/data input with the use of mini and microcomputers in the storage and handling of text and graphics with composition based on electronics or laser technology; (2) in graphic reproduction and platemaking with totally integrated systems now being perfected with the combination of microprocessors, lasers, electronic scanners, color simulation devices and new plates compatible with this integration; (3) in printing processes where completely automated presses are computer-controlled with ink, paper and color scanning being adjusted through a master console; (4) in binding and finishing where traditional labor-intensive operations are increasingly being replaced or aided by programmed, automated devices.[14]

Capacitation: the training of workers currently laboring in the graphic arts industry; accepted levels of training are specified by plans and programs are issued by individual firms through their mixed commissions.

Mixed Commissions: groups composed of workers and owners whose objective is to plan, implement and approve plans and programs directed to training and capacitating all employees within the firm.

Internal Instructors: workers chosen for technical or leadership qualities and who lead training within their firms to comply with labor laws requiring capacitation of workers.

DELIMITATION OF THE STUDY

This study is restricted to the graphic arts industry in Mexico, its major emphasis being the training/educating aspects of the industry.

It is hoped that the findings may be helpful not only as they apply to Mexico but also in their possible adaptation to other countries in Latin America.

SIGNIFICANCE OF THE STUDY

An extensive search of the literature indicated that no recent study of the Mexican training/educating situation in the graphic arts industry had been completed.

More needs to be known about how the graphic arts industry in developing countries is adapting to fast-paced changes in technology; this adaptation has been made the more difficult by the short period of familiarization and time for assimilation allowed in the industry. This sudden acquisition of technology forced the industry into "unprecedented retraining efforts"[15] while trying to set up adequate training facilities that could respond quickly and effectively to demands of skilled personnel.

Organizations in the United States and Europe are involving themselves more into the training efforts of this sector; it is hoped that new investigations and inquiries will develop from these entities.

The acquisition of new technology by Mexico also has economic importance to manufacturers/suppliers exporting equipment who want to

maintain and increase their share of this growing market. United States sales of printing equipment to Mexico exceeded US$19 million in 1978 and are expected to reach US$41 million in 1984, increasing in its share of the market from 51 percent to 54 percent.[16] The decisive factor in the purchase of new equipment by Mexican industrialists may very well be determined not only by labor-saving, durability and quality output considerations, but also by the "training package" and follow-up in technical aid by the seller. Training approaches must be instituted by manufacturers/suppliers that will consider the special training needs and realities of the Mexican worker; literature and manuals must be understood by the operator - manuals designed for use in highly industrialized countries will be of little assistance to a work force in which half have only an elementary school education and 40 percent have completed secondary school. Simplicity and "ample illustrations" should, in this case, be of utmost importance.[17]

It is hoped that Mexican organizations will find the information helpful in reviewing educational, technological or economic aspects of the graphic arts industry in their country.

ORGANIZATION OF THE REMAINDER OF THE STUDY

The remainder of the study is organized as follows: Chapter 3 is a brief overview of the historical background of the printing industry in Mexico. Chapter 4 deals with the present status of the graphic arts industry in relation to the economic, social and political milieu

of the country. Chapter 5 covers the different training and capacitating aspects currently underway in Mexico. Chapter 6 contains the summary of the study, including findings and conclusions. The questionnaire used and a tabulation of results are found in the Appendix.

FOOTNOTES FOR CHAPTER 1

[1]U.S., Department of Commerce, International Trade Administration, Country Market Survey, Graphic Industries Equipment, Mexico, International Marketing Information Series Pubn. No. CMS 80-005 (September 1980), p. 2.

[2]United Nations, International Labour Organization, Training and Retraining Needs in the Printing and Allied Trades: Second Tripartite Technical Meeting for the Printing and Allied Trades, (Report II, 1981), p. 15.

[3]U.S., Department of Commerce, CMS 80-005, op. cit., p. 8.

[4]Gilberto Rodríguez R., "Capacitarse para Capacitar," Impresor Internacional, June 1982, p. 8.

[5]Ibid.

[6]United Nations, Report II 1981, op. cit., p. 28.

[7]Ley Federal del Trabajo, Diario Oficial, Mexico, D.F.

[8]United Nations, Report II 1981, op. cit., p. 84.

[9]Jeronimo C. Hernández Baeza, "El Comportamiento Obrero en el Sector de las Artes Gráficas" (Investigative Thesis, Universidad Nacional Autónoma de México, 1981), pp. 94-95.

[10]United Nations, Report II 1981, op. cit., p. 83.

[11]Miguel Aguilera Lopez, "La Columna del Comandante Miguel Aguilera Lopez," Impresor Internacional, February 1982, p. 7.

[12]Centro de Capacitación y Adiestramiento para Trabajadores de Artes Gráficas, "Programa de Cursos Julio-Diciembre de 1981," Cámara Nacional de la Industria de Artes Gráficas, May-June 1981.

[13]United Nations, International Labour Organization, Technological Developments and their Implications for Employment in the Printing and Allied Trades, with Particular Reference to Developing Countries, (Report III, 1981), p. 1.

[14]United Nations, Report III 1981, op. cit., p. 11.

[15]United Nations, Report II, p. 89.

[16]U.S., Department of Commerce, CMS 80-005, op. cit., p. 3.

[17]Hernandez Baeza, op. cit., pp. 153-158.

[18]Gilberto Rodríguez R., "Necesidad de Crear Conciencia Colectiva para Participar y Contribuir al Bien Común en la Industria de las Artes Gráficas," Impresor Internacional, June 1982, p. 48.

CHAPTER 2

METHOD OF PROCEDURE

The procedures of this study were formulated within the framework of conventional historical research methods.

LITERATURE SEARCH

Thorough literature searches were conducted at the Technical and Education Center of the Graphic Arts and the Wallace libraries in Rochester Institute of Technology, Rochester, N.Y.

Library and other publishing sources were contacted in Washington, D.C.: the Library of Congress, with card catalogue and computer (SCORPIO and National Referral Service files) searches being conducted; the Pan American Union Library; the Inter-American Development Bank Library; the U.S. Commerce Department and the International Labor Organization were consulted for publications and data on the subject.

The Library of the University of North Carolina at Charlotte was used extensively for in-depth background information on the social, economic and political aspects of Mexico. A search of Dissertation Abstract International was also conducted at this time.

RESEARCH CONDUCTED IN MEXICO

Research directly connected with Mexico was done in two stages: (1) through the initial mailing of questionnaires and (2) through field research and interviews conducted personally in Mexico.

Questionnaires were mailed to 54 firms chosen at random from lists provided by the National Chamber of the Graphic Arts Industry in Mexico and the Graphic Arts Technical Foundation from their list of members in Mexico. These questionnaires were designed to survey the following areas: (1) existing training/educating facilities in Mexico; (2) availability of training through the firms surveyed; (3) acquisition of new technology and problems encountered in training personnel in its operation; (4) determination of other means and methods being used in the industry for the exchange of technical information; (5) the need for a centralized technical information and training center in Mexico.

The following research objectives were undertaken through field research in Mexico: (1) literature search of the library of the National University of Mexico in Mexico City; (2) data review on imports at the Instituto Méxicano de Comercio Exterior (Mexican Institute of Foreign Trade); (3) data review relevant to the graphic arts industry in Mexico through publication at the Dirección General de Estadística (General Directorate of Statistics); (4) information obtained through the Secretaría de Educación Pública (Secretariat of Education) in regard to vocational training programs in the Graphic Arts; (5) interviews with officials of groups participating in the training and capacitating efforts in the industry.

CHAPTER 3

HISTORICAL PERSPECTIVE OF THE GRAPHIC ARTS INDUSTRY IN MEXICO

Some interesting activities are traced back as long as 100 B.C. when paper was fabricated by the Mayans in the Yucatan Peninsula. Fig trees provided the natural fibers for this early paper which was, according to some historians, a superior paper to the papyrus paper made by the Egyptians.[1]

This paper was used in the writing of the _códices_ by the _Mayas_ for the writing of pictograms. Unfortunately, few of these ancient codices remain; the Spanish Conquest and subsequent "christianizing" of Mexico resulted in the destruction of a large number of these documents.[2]

The _Toltecas_, successors to the Mayans, manufactured paper from the inner bark of trees. This paper was used in ceremonial rituals but also for recording trade transactions.[3]

The Spanish Conquest and subsequent administration of the colony brought a need for more printed materials.

PRINTING HISTORY OF MEXICO

1535 is the date given in some historical sources as being when the first press was founded in Mexico, New Spain. Its founder was the Spaniard Estéban Martín, sent from Spain by the Fray Juan de Zumárraga, bishop of Mexico. The first book identified with this press was Escala Espiritual para Llegar al Cielo (Spiritual Guide to Heaven) written by Juan Clímaco and translated from Latin to Spanish by Juan de Estrada and printed in 1535. No issues from this printing survive.

The next date affirmed to be the earliest for a known press in Mexico is 1539. Giovanni Paoli, an Italian better known for his Spanish name of Juan Pablo, was the founder of this press. Fray Juan de Zumárraga was also instrumental in originating this enterprise when he arranged a contract with Juan Kromberger, of the House of Kromberger in Sevilla, Spain, for the purchase and installation of this press in New Spain. The press was installed in 1539 in a wing of the building known as Palacio Episcopal de México and as Casa de las Campanas. The first book printed was Breve y más Comprendiosa Doctrina Cristiana en la Lengua Castellana y Mexicana (Brief and Comprehensive Christian Doctrine in the Castilian and Mexican Language). The original printing press used by Juan Pablo survives and is proudly displayed at the National Graphic Arts Museum in Mexico City.[4]

Publishing in Mexico became an important activity during the spanish rule. Typefaces were designed and manufactured in Mexico. Spaniards and europeans came to Mexico and founded new publishing ventures; Antonio de Espinoza, Antonio Alvarez, Pedro Ocharte, Pedro

Balli, are some of the names associated with this early period until the end of the fourteenth century. Geronimo Balli, active from 1608 to 1610, established his Taller de Imprenta (printing shop) next to the convent of Tlaltelolco and was used as a school to teach letterpress skills to indians. Robredo, Porrua, Guerrero, Pola, are printers identified with publishing in Mexico during the 17th and 18th centures.[5]

Of interest in comparing growth of printing in other American countries is the establishment of the first press in what was then a British colony, Massachusetts; this press was installed by Stephen Daye in Cambridge in the year 1638. Virginia followed in 1682.[6]

With the Mexican revolution of 1910 came new impetus to the publishing industry. Private publishing houses pioneered the publication of books for the new order; among these were Porrua, Robredo and Cultura y Botas. Officially, the Secretariat of Education was the early initiator of large scale publication directed to cultural enrichment of the population; José Vasconcelos was a leader in this publication effort. Later developments during the presidency of Lazaro Cardenas helped the growth of publishing by exempting it from import taxes and sales taxes. These protective policies have continued to today.[7]

FOOTNOTES FOR CHAPTER 3

[1]Alfonso Salazar Rovirosa, Historia de las Artes Gráficas, quoted in El Tlacuilo, May-June 1981 (Mexico, D.F.), p. 33.

[2]Ibid., p. 34.

[3]Ibid.

[4]Alfonso Salazar Rovirosa, Cronología de las Artes Gráficas, Una Lección Visual de Arte (Mexico, D.F.: Ediciones Económicas, 1961), pp. 48-54.

[5]Ibid.

[6]Ibid.

[7]Jorge Avendaño-Inestrillas, "La Industria Editorial en México Consolida su Posición," Artes Gráficas USA, June-July 1977, p. 14.

CHAPTER 4

PRESENT STATUS OF THE INDUSTRY

Mexico has just completed an unprecedented period of industrial growth sponsored by the outgoing administration of Jose Lopez Portillo. Public spending was forced up to create new job opportunities at a rate that would exceed population growth; private investment was also considerable during this period.[1]

ECONOMIC GROWTH

The Mexican graphic arts industry is one of the largest and fastest growing sectors with private investment forecasted to reach US$78 million for equipment purchases in 1984, up an average 12 percent per year from 1979 purchases of US$44.7 million.[2] A more specific breakdown per industry is listed in Table 1.

The rapid growth of the general economy created a demand for "magazines, newspapers, books, printed business forms and printed packaging materials."[3] This demand, combined with rising inflation and escalating labour costs were factors in the 8 percent annual growth posted by the graphic industry. Sales for the industry reached US$1 billion in 1978 and forecasts are for US$1.6 billion in 1984.[4]

Table 1

Mexico: Capital Expenditures and Purchases of Graphic Industries Equipment by Major User Sectors, 1979 and 1984
(in millions of U.S. dollars)

	Capital expenditures		Purchases of graphic industries equipment	
	1979	1984	1979	1984
Newspaper publishing and printing	16.0	21	8.05	12.0
Magazine publishing and printing	11.0	22	6.70	12.0
Book publishing and printing	8.5	15	5.35	10.5
Commercial printing	19.0	31	11.80	20.0
Business forms printing	4.5	10	2.65	6.0
Printing for packaging	6.5	11	4.25	7.0
Government printing	.5	2	.40	1.5
Service industries for the printing trade[1]	7.5	11	4.75	7.0
In-plant printing[2]	1.5	3	.75	2.0
Total	75.0	126	44.70	78.0

[1]Includes establishments primarily engaged in typesetting, photoengraving, electrotyping, stereotyping, lithographic platemaking, and related services for the printing trade.

[2]The term "in-plant printing" denotes printing facilities owned by a business or other entity and producing printed matter solely for the entity's own use.

Source: International Trade Administration, Office of Export Planning and Evaluation research study.
U.S. Department of Commerce, Country Market Survey, Graphic Arts Equipment-Mexico.

Mexico's economic growth (Gross Domestic Product) has been estimated at more than 8 percent for the last four years and was expected to reach 10 percent in the early 1980's.[5] A much lower growth is now expected due to conditions created by the devaluation of the Mexican Peso in February 1982. What effect devaluation will have on the expansion of the graphic arts industry is not yet clear, although reductions in public spending, price hikes and labor wage increases will most likely slow down its previous growth.[6]

STRUCTURE OF THE MEXICAN GRAPHIC ARTS INDUSTRY

Statistical data obtained through the Secretaría de Programación y Presupuesto regarding the graphic industry is based on the 1975 industrial census, with data from the 1980 census still under analysis. Figure 1 shows the major groups of the industry. The census data on classification of business as per activity is not always well defined. Large firms sometimes break up their activities into separate units, making it difficult to categorize their main activity. Some workshops may also be active in several sectors.[7]

Figures for 1978 show nearly five thousand firms employing 54,000 workers; with growing domestic and foreign markets, it is estimated that by 1984 there will be 5260 firms employing 69,700 workers.[8] Table 2 shows sales, number of firms, and number of employees.

Small business dominate the industry. Close to seventy percent of these shops employ fewer than one hundred workers. In 1978, 638 of the largest firms employed thirteen percent of the workforce.[9]

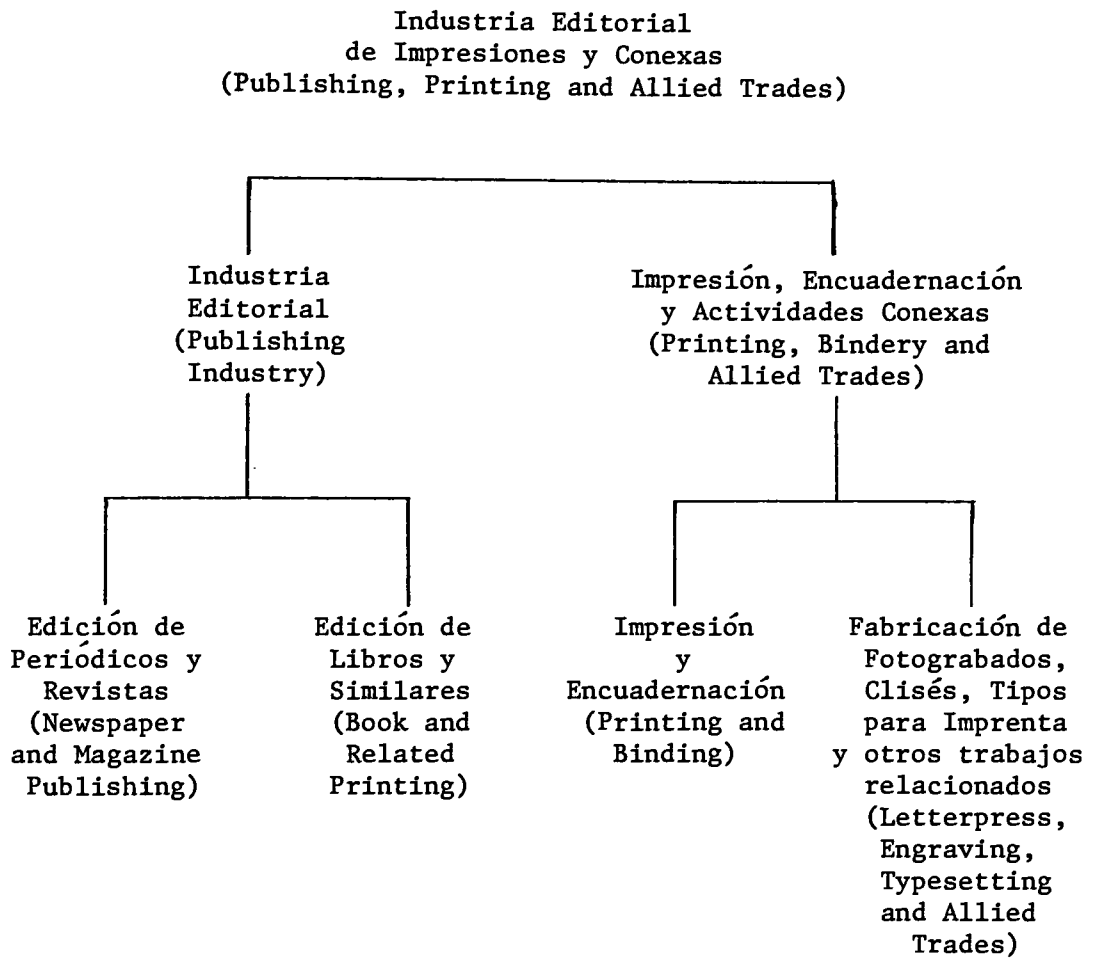

Figure 1. Structure of the Graphic Arts Industry in Mexico.

Table 2

Mexico: Sales, Number of Firms, and Number of Employees of the Printing Industry, 1974, 1978, and 1984

	Sales (in millions of U.S. dollars)			Number of firms			Number of employees		
	1974	1978	1984	1974	1978	1984	1974	1978	1984
Newspapers	197.5	236.5	317	315	300	300	11,506	13,680	17,300
Magazines	110.5	181.5	310	150	200	240	4,374	5,240	6,000
Books	100.5	139.0	186	160	190	210	7,441	8,658	10,700
Commercial printing	167.5	244.6	436	3,200	3,300	3,470	16,696	17,661	24,600
Business forms printing	40.5	75.0	132	30	35	40	1,276	1,500	1,650
Printing for packaging	62.0	85.5	152	250	270	300	3,028	3,600	4,600
Service industries for the printing trade[1]	75.0	96.0	111	580	650	700	3,026	3,617	4,850
Total	753.5	1,058.1	1,644	4,685	4,945	5,260	47,347	53,956	69,700

[1] Includes establishments primarily engaged in typesetting, photoengraving, electrotyping, stereotyping, lithographic platemaking, and related services for the printing trade.

Source: Data based on the Industrial Census 1975 and International Trade Administration, Office of Export Planning and Evaluation research study.
U.S. Department of Commerce, Country Market Survey, Graphic Industries Equipment-Mexico.

Table 3

Mexico: Type of Printing Process as Percentage of Total Dollar Volume of Printing by End-User Sectors, 1979 and 1984

	Letter-press		Offset lithography		Gravure		Screen		
	1979	1984	1979	1984	1979	1984	1979	1984	Total
Newspaper publishing and printing	25	10	73	88	2	2	0	0	100
Magazine publishing and printing	25	15	65	80	10	5	0	0	100
Book publishing and printing	35	20	63	77	2	3	0	0	100
Commercial printing	25	5	60	85	5	5	10	5	100
Business forms printing	10	5	90	95	0	0	0	0	100
Printing for packaging	10	5	20	25	40	35	30	35	100
Government printing	55	40	45	60	0	0	0	0	100
In-plant printing[1]	30	25	70	75	0	0	0	0	100

[1]The term "in-plant printing" denotes printing facilities owned by a business or other entity and producing printed matter solely for the entity's own use.

Source: International Trade Administration, Office of Export Planning and Evaluation research report.
U.S. Department of Commerce, Country Market Survey, Graphic Arts Equipment-Mexico.

Hot metal typesetting and letterpress printing is still very common in Mexico but the trend here is one of slow obsolescence due mainly to reduced supply of machinery and spare parts being manufactured. Table 3 shows the percentage of total dollar volume, including letterpress, by printing processes.

TECHNOLOGICAL TRANSFER

Mexico imports all of its graphic arts equipment except for three percent of photographic equipment manufactured in the country.[10] Pressroom chemicals and inks are readily available from local sources and metal plates are manufactured domestically.[11]

Most of the imported equipment proceeds from the United States, particularly photographic and typesetting machinery which are considered "technologically advanced, high speed, high capacity products."[12] European press and bindery equipment is preferred and viewed as being more durable and reliable under harsh use conditions.[13] Tables 4 and 5 contain related import data.

Conversion from manual and mechanical processes to phototypesetting equipment is progressing rapidly. Offset lithography is replacing letterpress;[14] it is important to note in this respect that letterpress with hand and machine typesetting in Mexico will continue to co-exist with newer technology, especially in the provinces where more small and under-capitalized firms exist; several factors insure their continued

Table 4

Mexico: Total Market and Imports from the United States of Selected Types of Graphic Industries equipment, 1979 and 1984 (in millions of U.S. dollars)

	1979		1984	
	Total market	Imports from the U.S.	Total market	Imports from the U.S.
Direct-entry phototypesetting machines	1.20	1.16	2.30	2.20
Tape-driven phototypesetting machines without CRT	.04	.02	-	-
Keyboard data entry machines	.60	.50	1.20	1.10
Video display terminals	.90	.80	2.00	1.95
Photocomposition machines for display ads or full-page layout	.60	.55	.70	.68
Multistation copy entry systems	-	-	.90	.85
Offset platemaking equipment	.12	.10	.15	.14
Process cameras	1.50	1.10	2.30	1.70
Lighting systems	.90	.60	1.70	1.30
Color separation systems	1.50	.80	1.60	.90
Automatic film processors	.20	.10	.50	.30
Sheet-fed offset presses	15.00	7.50[1]	24.00	12.00[1]
Web-fed offset presses	7.00	3.50	12.00	6.00
Flexographic presses	.30	.20	.50	.40
Quality control equipment	.50	.40	.65	.55
Materials handling equipment	.50	.40	.60	.55
Pollution control equipment	-	-	.30	.30

[1]Includes purchases of used equipment which may not be of original U.S. manufacture, although bought in the United States.

Source: International Trade Administration, Office of Export Planning and Evaluation research study.
U.S. Commerce Department, Country Market Survey, Graphic Industries Equipment-Mexico.

Table 5

Mexico: Imports of Graphic Industries Equipment by Country of Origin, 1974 and 1978 (in millions of U.S. dollars)

	1974	1978
Typemaking and typesetting machinery		
United States	1.78	3.50
Germany	.24	.17
United Kingdom	.83	.08
Italy	.09	.05
Other	.18	.04
Subtotal	3.12	3.84
Photographic equipment for the graphic industries		
United States	2.02	2.92
Germany	.98	.60
United Kingdom	.03	.25
Japan	.11	.07
Other	.33	.06
Subtotal	3.47	3.90
Presses and other printing machinery		
United States	7.72	11.85
Germany	4.73	5.95
Switzerland	.19	3.65
Italy	.60	.85
Other	2.02	2.39
Subtotal	15.26	24.69
Bookbinding machinery		
United States	.74	.94
Germany	.50	2.52
United Kingdom	.01	.54
Switzerland	.19	.44
Other	.26	.67
Subtotal	1.70	5.11
Total	23.55	37.54

Source: Based on data from the statistical yearbooks of Secretaria de Programacion y Presupuesto.
U.S. Commerce Department, Country Market Survey, Graphic Industries Equipment-Mexico.

existence: letterpress equipment is easy to maintain and operate, can be used with lower grades of paper, corrections and alterations are easier and small jobs can be produced more economically. It could be said that letterpress and machine typesetting will remain "technologically appropriate" processes in Mexico for some time to come if used and new machinery and spare parts can still be obtained.[15]

Technological transfer has created serious problems for the graphic industry, not the least being the lack of an infrastructure of skilled labor to handle new equipment. "Mexican printers suffer from a chronic shortage of skilled personnel. Much of the present work force has been trained in outdated manual methods, and the overburdened educational system is unable to provide sufficient number of workers with the skills now in demand."[16]

Other problems worth mentioning in relation to technological changes are those related to redundancy, loss of jobs and fear of technological and economic dependency on industrialized nations.[17]

FOOTNOTES FOR CHAPTER 4

[1]BANAMEX (Banco Nacional de México, S.R.), "Review of the Economic Situation of Mexico," Report on the Economy, March 1982, p. 82.

[2]U.S., Department of Commerce, CMS 80-005, op. cit., p. 2.

[3]Ibid.

[4]Ibid., p. 7.

[5]Ibid.

[6]BANAMEX, op. cit., pp. 85, 93.

[7]U.S., Department of Commerce, National Technical Information Service, The Mexican Market for Graphic Industry Equipment, by Batres, Valdes, Wygard Y Asociados, S.C., December 1979, Publication No. DIB 80-03-505, pp. 13-14.

[8]U.S., Department of Commerce, CMS 80-005, op. cit., p. 7.

[9]Ibid., p. 8.

[10]Ibid., p. 3.

[11]Ibid., p. 8.

[12]Ibid., p. 3.

[13]U.S., Department of Commerce, DIB 80-03-505, op. cit., p. 52.

[14]Ibid., p. 39.

[15]United Nations, Report III 1981, op. cit., p. 5.

[16]U.S., Department of Commerce, CMS 80-005, op. cit., p. 8.

[17]Luis Cisneros y Ramirez, "Lo que Cuesta a México la Importación de Conocimientos. La Moderna Tecnología," El Tlacuilo, May-June 1981, p. 3.

CHAPTER 5

PRESENT SCOPE OF TRAINING/EDUCATING EFFORTS

DEMOGRAPHIC ASPECTS OF MEXICO

Population growth in Mexico has been among the highest in the world, with a current 2.8 percent annually, down from 3.4 percent from previous years.[1] From a total population of approximately 70 million, an estimated 18 million are economically active with 7.5 million in agriculture, forestry and fishing and 3.2 million in manufacturing.

The literacy rate in Mexico is estimated to be about 75-80 percent and rising. The general level of education, however, is very low. In education the government has made efforts to enroll all children in primary schools, providing free books. Expenditures per pupil have risen since 1960, although education comprised only four percent of the national budget in 1978 and decreased to 3.2 percent in 1979.[3]

Some educators maintain that the problem is

> ... the lack of appropriate education. Many go to primary school, but few finish secondary school. The total number of entrants into higher education is less than 250,000. Those who graduate and go on to a university or technical school are a social elite. The majority barely learns to read and write.[4]

Unemployment and underemployment are estimated by the government to be about 49 percent, with underemployment being considered the more serious problem.[5] The Mexican labor force is characterized by an excess of unskilled workers and a shortage of skilled and managerial personnel.[6]

Most workers are trained on-the-job rather than through formal schooling. Lack of education is considered a stumbling block by most Mexicans in their career advancement. In the case of highly educated graduates from universities and technical schools, a great number do not find related work in industry and move into other jobs, mostly service related and far from their professional background.[7]

Trained workers are concentrated largely in and around Mexico City, Monterrey, Guadalajara and Puebla, the most industrialized areas in Mexico.[8]

EDUCATIONAL BACKGROUND OF LABOR FORCE

Education in Mexico, both academic and technical/vocational, was almost non-existent until the 1910 Mexican Revolution. With primary and middle schools on the increase, the government created in 1923 a federal agency for the administration of technical schools of the middle level, the Directorate of Technical, Industrial and Commercial Education.[9] The creation of the National Polytechnical Institute in 1937 was the beginning of contemporary technical/vocational education in Mexico.[10]

The present technical/vocational education system can be classified in four areas: (1) secondary vocational; (2) secondary technical; (3) technical or post-secondary and (4) further specialized training. The complete structure of the national system of education in Mexico is shown in Figure 2.

In 1957 the National Technical Council of Education was created to coordinate educational plans throughout the country, with its main objective being to provide equal educational opportunities throughout the republic. This council had, among other duties, the study and approval of curriculum for all types of education, including the federal secondary schools.[11]

In 1948 the first Regional Technological Institute was established.[12] Today there are forty-nine of these institutes throughout Mexico. Their programs are intended to provide a more democratic approach to education, promote regional industrial development and encourage new generations to remain in their home regions.[13] These institutes can be compared to United States community colleges and comprehensive area vocational schools;[14] students are prepared for entering the skilled job market or for further education at university level. Technical Institutes curriculums showed no courses being offered in the graphic arts, although their graduates are hired to fill positions within the graphic industry.[15]

Only one secondary technical school offering graphic arts related programs was found in Mexico City. This school is the Centro de Estudios Tecnológicos No. 11.[16] Fields of study offered at this school

Pre-school

Kindergarten

Primary: 6 years

Grades 1-6

Secondary level

I. Junior high school: 3 years

Industrial and agricultural training courses
General secondary studies
Televised secondary studies

II. Senior high school: 3 years

General university preparatory
Technical preparatory
Technical agriculture
Industrial and commercial studies
Commercial fishing
National University of Mexico Preparatory
National Polytechnical Vocational Schools
Normal College for Primary School Teachers

Higher education: 2-6 years

University
National Polytechnical Institute
Regional Technical Institutes
Normal and Superior Colleges

Source: (Deliganis, 1978:23)

Figure 2. The National System of Education in Mexico

were: (1) Commercial Artist; (2) Publishing Director; (3) Bindery; (4) Linotypist. Training for these courses has a three year duration.

One other center on the same level was located at the city of Queretaro, state of Queretaro, the Centro de Estudios Técnicos No. 378, also known as Centro de Estudios Tecnológicos de Artes Gráficas Mexicano-Italiano. This center was created through an agreement of technical cooperation between the Mexican and Italian governments and could very well be the prototype of much needed centers created through the mutual cooperation of the Mexican industry and government and other parties from industrialized nations. A more detailed description of activities, curriculum and goals of this center is given later in this study.

CLASSIFICATION OF TRAINING NEEDS

It is estimated that in 1978 there were 43,200 production workers in the graphic industries, with predictions of 56,000 by 1984. Of the workers presently employed, around 33 percent are in commercial printing, 25 percent in newspapers, 10 percent in magazines and some 15 percent in books and the remnant in allied trades.[17]

The graphic arts industry in Mexico is largely formed by small firms averaging eleven workers (1978); these small firms are on the majority family owned and operated, but some are part of larger printing operations wanting to diminish trade union influence.[18]

There is a lack of demographical statistics on the graphic industry worker. Only one related recent study was located; this study

by Jeronimo C. Hernández Baeza was originally conducted to determine workers attitudes toward their jobs and the industry in which they labor; conducted with the cooperation of member firms of the Unión de Industriales Litógrafos de México, 374 production workers were polled, with some of the main findings being:

1. Fifty-three percent of the workforce were less than 30 years old, with 32 percent being 25 years old or less;
2. Almost half (47.6 percent) had completed elementary school, with 36.4 percent having completed secondary school;
3. Less than 20 percent were women;
4. The largest percentage (44.6) had been with their companies from one to five years;
5. Only 12 percent of respondents asked about their greatest ambition felt education to be important, with earning more money (29.3 percent), purchasing a home (27.4 percent) and having own business (22.2 percent) being given top priorities;
6. Half felt their earnings did not reflect their work performance;
7. Almost 72 percent indicated belonging to the trade union;
8. Good salaries, safety, and promotions were judged in the order of importance shown, with interesting work judged least important;
9. Thirty percent felt that productivity could be improved with new equipment, 28 percent felt productivity improvement to result through better salaries, 17 percent if treated better by their bosses;
10. Forty-four percent felt that their productivity was in the 51-75 percent range, with 40 percent acknowledging that they were 76-100 percent productive.

The following breakdown of training needs per category of workers involved should indicate levels of skills required by the industry.

Semi-skilled Production Workers

These are workers requiring a minimum amount of training to acquire production skills within the enterprise's criteria for quality and productivity. The training pattern for this group by firms has traditionally been on-the-job trained by skilled or experienced workers who teach the newcomer the basic production skills.[19] This system may still remain adequate in some instances, but with increasing automation a more intensive approach will be needed.[20]

Craftsmen and Skilled Workers

Trade demarcations of well defined craftsmen training systems are not found in Mexico as they are in industrialized nations possessing a long-standing tradition in this area.[21] A more flexible approach is needed in countries like Mexico where fast technological changes make it necessary to train skilled personnel with speed and effectiveness. As a rule, on-the-job training seems to be the most common approach to the training of this sector; lack of training facilities accentuate this problem since this level of training requires a combination of technical-theoretical knowledge, with actual use of equipment to reinforce theory. The lack of training centers possessing adequate equipment is a common problem to developing industries like Mexico's.[22]

Small and medium firms lack the resources, knowledge and equipment to raise the skill level of their workers.[23] Specialization in these firms is an impossibility due to the involvement of workers in several production areas; in large operations a worker may be able to specialize in a distinct area or craft.

Although 60 percent of the 43,000 production workers in the industry in 1979 were considered "skilled," sources in Mexico consider that "no more than 40 to 50 people in the industry were capable of getting full performance from more advanced technology and computerized equipment. There are an estimated 4-500 computerized equipment operators in the field."[24]

Supervisors and Technicians

Supervisors have traditionally advanced in the industry through promotion from the ranks of skilled workers, with little previous preparation to prepare them for their new responsibilities.[25] Supervisory positions will increasingly be filled by technical institute and university graduates.[26] Some programs are now being developed for this sector with emphasis on pedagogical and leadership training.[27]

Technicians are essential in the operation of new technology; they must be able to "understand the new machinery and how a particular system works, be capable of diagnosis and problem-solving skills, particularly in the area of maintenance and repair. In general, they must have the intelligence to acquire working knowledge of the over-all technology."[28] Efforts in Mexico in this area are being pursued by the available technical schools and by manufacturers/suppliers training

centers who offer a more in-depth coverage of technical fields like photomechanics, plate processing, ink and film technology.[29]

The training situation in Mexico today is a complex one with considerate efforts being made by several sectors: (1) the Federal Government through its Law of Capacitation and the coordinating unit UCECA; (2) secondary school technical centers; (3) manufacturers/ suppliers training centers; (4) mesas redondas or technical meetings; (5) seminars and programs by employers and trade union groups. The following section describes some of these in greater detail.

GROUPS INVOLVED IN TRAINING/EDUCATING ACTIVITIES

The institutions and groups described below do in some cases encompass several areas and degrees of training, with some duplication of effort taking place.[30]

Representative Groups

> Trade unions, employers, teachers' and professionals' organizations, etc. These usually take an active interest in defining content of training and in implementing.[31]

Three Mexican organizations within this category are involved in training: the Cámara Nacional de la Industria de Artes Gráficas; the Unión de Industriales Litógrafos de México; and the Unión de Obreros de Artes Gráficas. The first two are employers' organizations, the last the trade union for the industry.

The Cámara Nacional de la Industria de Artes Gráficas (National Chamber of the Graphic Arts Industry) was founded in February 1966 when

the First National Congress of the Graphic Arts Industry took place; the Chamber is today the largest association of graphic arts firms in Mexico with a total membership for 1981 of well over four thousand.

Table 6 shows the breakdown of membership per activity in the industry:

TABLE 6

MEMBERSHIP CLASSIFICATION
OF THE NATIONAL CHAMBER OF THE GRAPHIC ARTS INDUSTRY, 1981

Type of Activity	Number of Members
Letterpress	3000
Offset Lithography	600
Bindery	160
Photo Engraving	280
Silk Screen	80
Steel Engraving	100
Other Specialties	220

Source: Cámara Nacional de la Industria de Artes Gráficas, Directorio de Socios 1981 (Mexico, D.F.), p. 6.

The Chamber's functions and objectives include among others:

1. Representation of the National Graphic Industry before Federal and local authorities; also representation before other bodies like the Confederation on Industrial Chambers of the Mexican United States and the Latin American Confederation of Graphic Arts Industries.
2. Develop better communication between members and suppliers of raw materials, distributors and equipment manufacturers.
3. Provide member firms all type of information relating to the Graphic Arts.
4. Hold conferences and seminars regarding themes of general interest to member firms.
5. Help develop relations and technical and commercial interchange among members.
6. Organize graphic arts exhibits to help foment technology.[33]

Regarding the training and capacitating activities of the Chamber, its main efforts have been in the development of programs directed to instructores internos (internal instructors), offered through the chamber's official training center, Centro de Capacitación y

Adiestramiento para Trabajadores de Artes Gráficas/CECATAG (Center for Capacitation and Training for Graphic Art Workers).

The Center for Capacitation has the following general guidelines for its activities:

1. To decrease the problem of lack of training and capacitation found in the industry through efforts in the area that will satisfy and benefit the existing needs of the graphic industry in general.
2. To prevent the loss of skills that the graphic worker has, with such difficulty, acquired through shop practice.
3. To create a continuous capacitation and training toward forming highly capable personnel (knowledge and skills), prepared for particular needs. Also insure that another prepared, qualified individual will always exist to replace the leaving worker and so insure the functioning and success of the firm.
4. To instill in workers an interest in their own training and education.
5. To create interest and motivation among outstanding workers, technicians, supervisors and shop managers to train and capacitate in their respective field of expertise with appropriate instruction for them to transmit their knowledge through didactic methods.
6. To increase the skill level of all workers.[34]

With the advent of the modification by the government to the Labor Law in 1978, making it compulsory for business to capacitate and train their labor force, the Center of Capacitation (CECATAG) and the Unidad Coordinadora del Empleo, Capacitación y Adiestramiento/UCECA (Coordinating Unit for Capacitating and Training), cooperated in developing a Sistema General (General System) under the Internal Instructor program. The program of Internal Instructor is directed to chosen personnel who in turn can make use of pedagogical-didactic techniques learned through the program and apply them in teaching/training others within the firm. The emphasis on theoretical and pedagogical content has created objection from others in the industry who feel equal consideration should be given to technical application of theory received through on-hands training.[35]

A program of courses under the General System of Internal Instructors listed the following areas: (1) Typographical Composition; (2) Photomechanic; (3) Letterpress; (4) Offset; (5) Stripping Techniques; (6) Silk Screen; (7) Platemaking; (8) Bindery; (9) Steel Engraving; (10) Flexography; (11) Photoengraving; (12) Diecutting; (13) Rotogravure.[36]

It can be said that the Internal Instructor program of capacitation as viewed by the Chamber and its Capacitation Center is an ambitious undertaking, where a larger educational perspective of training is being attempted; this program, as designed, should meet and supplement the lack of a formal educational base found in the workforce.[37] There are problems in the implementation of the program: (1) employers wanting a more pragmatic approach to help them comply with the capacitation laws and to train their workers quickly, may find it difficult to delve in the pedagogical and theoretical aspects of the program; (2) acceptance of the Internal Instructor and the performance of his functions by fellow workers will depend largely on the individual character and personality of the instructor, making standardized application hard to achieve; (3) lack of self-evaluation procedures has occurred in training programs in developing countries and this may still be a difficult task in Mexico to determine the effectiveness and long-range change produced by the program.[38]

The Unión de Industriales Litógrafos de México, A.C./UILM (Union of Industrial Lithographers of Mexico) was founded in 1931 with five original firms and today consists of 67 member firms involved in

the Offset Lithography process, which includes both sheetfed and web operations.

The objectives of this organization are similar to those of the National Chamber in that it too watches over the combined interests of its members and addresses the particular problems facing the offset lithography sector of the industry.

A training center known as the Centro de Capacitación Litográfica (Center for Lithographic Operations) operates under the auspices of the UILM and conducts in-plant training with the instructors and teaching aids furnished by the UILM.

Among the objectives of this training center are the following:

1. To establish plans and methodology for courses given.
2. To establish appropriate schedules as to time, personnel involved and field of specialty.
3. To study and analyse the different topics offered by each course.
4. To undertake a brief inquiry on the materials and elements used during training.
5. To establish a constructive and competitive policy among those taking courses to stress the importance of the training for the betterment of firm and employee.
6. To create an adequate environment during courses and to direct men toward good work practices through which they can find happiness.[39]

The Center for Lithographic Capacitation was originally equipped with machinery to train students in shop practices, but the equipment was sold and the present system of in-plant training was adopted.[40]

Teaching of in-plant courses are scheduled according to members needs and time specification. Courses are taught mainly in the City of Mexico, where the bulk of the members operate, but some training is being done in Monterrey also.

Four instructors compose the teaching staff at this time. Courses offered last from six weeks to three months, depending on topic, with two weekly sessions of three hours each. An average of 30 courses are given by the center annually.

A list of present courses obtained from the UILM headquarters in Mexico City show the following offerings:

1. Technical Problems with Line Negatives
2. Basic Halftone Course
3. Advanced Halftone Course
4. Color Separation
5. Plates with Broken Images (Wipe-On)
6. Plates with Scum Problems (Wipe-On)
7. Plates with Scratches
8. Printing Problems Caused by Paper
9. Printing Problems Caused by Ink
10. Printing Problems Caused by Plates
11. Printing Problems Caused by Misregister
12. Printing Problems Caused by Press
13. Safety in the Pressroom

The reasons could not be determined as to why the Union of Lithographic Industries sold their training equipment and opted for the present system of in-plant capacitation; this lack of material facilities is seen as diminishing the effectiveness of its training center.[41] Associated with this system too is the lack of program standardization due to changing conditions and facilities among plants and shops where courses are given. No self-evaluation plan was in effect at the time of this study, but plans were being made to institute one such system in the future. Plans for faculty preparation were also being considered, among them pasantias (technical visits) to firms in industrialized countries and the acquisition of training programs through PIRA in England and NAPL in the United States.[42]

The Unión de Obreros de Artes Gráficas (Trade Union for Graphic Arts Workers) is the workers representative body in the industry.

More than 90 percent of production workers in firms over 25 employees are organized.[43] A recent study within the graphic arts industry showed 72 percent of polled workers as belonging to the trade union.[44]

Trade unions in Mexico are supported by government regulation and they remain strong today. Small printing, usually less than 25 workers, either by design or accident are not unionized.[45] Labour costs for owners vary according to geographical zones existing in Mexico, with 111 minimum wage zones presently in existence.[46] Minimum daily wage in Mexico City was roughly US$5.30 for 1979 with unskilled labor earning less.[47]

The trade union maintains a work shop for retraining workers due to redundancy caused by new technology.[48]

A major role in training and capacitating is played by the trade union through its members who function within the comisiones mixtas (mixed commissions) created by the Law of Capacitation and whose main function is to insure that capacitation programs and courses undertaken by workers meet the training goals set by the law. Since approval from the trade union members is imperative in qualifying and certifying workers under the law, the power exercised by the trade union is considerable.

Policy Bodies

> Departments and ministries, manpower and employment committees, training boards and institutions, local, national and international organizations, etc. These formulate policies at various levels to: increase employability; ease the transition from school to work and ensure that young people are adequately equipped to take their place in society, at home, at work and in their leisure hours; open up learning opportunities for adults, in particular to help them to adapt to the changing work environment; increase efficiency and minimize cost; encourage employers to do their full share in the field of training.[49]

Governmental institutions involved in training of the nation's workforce have been empowered by the modifications made to the Ley Federal del Trabajo (Federal Labor Law), particularly the Law on Capacitation and Training, Article 153, which reads:

> Business firms, whichever their activity are obligated to provide their workers with job capacitation and training. The bylaws will determine the methods, systems and procedures, in accordance to which owners must comply with said duty.

The following governmental bodies are involved in the execution and compliance of the capacitation law: (1) the Secretaría del Trabajo y Previsión Social (Secretariat of Labor and Social Welfare) which has the greatest authority in this endeavour; (2) La Secretaría de Educación Public (the Secretariat of Education); (3) the Servicio Nacional del Empleo, Capacitación y Adiestramiento (National Service for Jobs, Capacitation and Training); (4) the Unidad Coordinadora del Empleo, Capacitación y Adiestramiento/UCECA (Coordinating Unit for Capacitation and Training) whose responsibility is to direct, control, promote and execute all directives regarding the Law of Capacitation and Training; (5) the state and national advisory groups; (6) the national capacitation committees from industrial sectors.[50]

Article 153 of the Labor Law also specifies the creation of comisiones mixtas (mixed commissions) formed by owners and workers; these commissions determine time and place of training, type of training and who is to take it; they also provide final acceptance or refusal of training received by the workers.[51] Training can be held 50 percent within the firm and 50 percent with outside participation. A training plan and program must be presented by the mixed commission to the coordinating unit UCECA; these plans and programs presented to the UCECA for approval should not comprise a period longer than four years and no less than two years. Plans should list scheduled training of personnel in different operations and in accordance to each operational situation within the firm.[52]

Training and capacitation received by workers is certified by the mixed commissions by extending the Constancia de Habilidad (certificate of achievement) which is given after a worker has passed testing of skills and knowledge; final approval of certification still rests with the UCECA.[53]

The need to comply with this law is directing representative bodies like the National Chamber of the Industry of the Graphic Arts to design and direct the preparation of training programs such as the previously mentioned Instructor Interno.[54] The following description of the contents for the General System for the formation of internal instructors should help in understanding this program and its relation to the Law of Capacitation. The program is formed of modules that can be adapted to particular situations and individuals; the general format is

as follows: (1) Introduction to the Graphic Arts Industry; (2) Detection of Capacitation and Training Needs; (3) Principles of Adult-Teaching; (4) Development of Learning Objectives; (5) Group Dynamics and Techniques; (6) Teaching Aids; (7) Evaluating Instruments; (8) Handling of UCECA Forms.[55]

Other activities to aid the capacitation efforts are being promoted by the government and UCECA. Some of these activities are in fact a compendium of needs facing the graphic arts industry:

1. Establish a list of needs.
2. Instigate job analysis to determine the job structure of the industry.
3. Initiate studies regarding new equipment, new technology, its operation, and the inherent capacitating and training problems.
4. With the aid of previous studies, organize training curriculum with appropriate didactic-pedagogic techniques.
5. Aid in the creation of general policies regarding the prerequisites to be met by training/capacitating programs.
6. Publicize throughout the industry the plans of action to follow and successes of existing programs.
7. Establish the mechanics to expedite compliance with legal requirements such as registration of certificates of achievement, capacitation requirements, etc.
8. Help in the operation and integration of mixed commissions within firms in the industry.
9. Evaluate productivity results due to training/capacitating programs within the industry.[56]

One final government organization should be included here; this is the Centro Nacional de Productividad y el Adiestramiento Rapido de Mano de Obra - CeNaPro/ARMO (National Center for Productivity and the Rapid Training of Labor).

This center addresses the needs of the small and medium business, which can describe the majority of graphic firms. These needs are critical in management training for these firms and this is the area where CeNaPro/ARMO is providing general and specific training modules

in "capacitation, actualization and development directed to supervisors, middle management and owners."[57] The following training modules are offered for: (1) Director or General Manager; (2) Sales Manager; (3) Director of Production; (4) Personnel Director; (5) Production or Administrative Managers.[58]

Advisory, Research and Liaison Bodies

> Research agencies, management centers; local, national and international advisory bodies for specific industries or levels of education and training, etc. These bodies attempt to develop new areas and methods of education and training and improve the exchange of information. Some duplication of research and development usually occurs.[59]

GATF

With more than 1600 member firms throughout the world, the GATF provides a variety of teaching aids and materials prepared in different languages.[60] The GATF is a

> scientific, technical and education organization serving the international graphic communications industry. Conducts research in all graphic processes and their commercial applications. Conducts seminars, workshops, forums and conferences on graphic arts subjects.[61]

During field research for this study, numerous mentions were made regarding the use of GATF materials, training aids and audio-visuals with existing training programs. These materials were regarded as very valuable in the training of personnel.

One particular area of involvement for GATF which was suggested by sources in Mexico was the need for more educational research projects specifically designed for the graphic arts industry in Mexico. The GATF with its resources may be of aid in introducing such projects.

CONLATINGRAF

Although not directly involved in the training situation in Mexico, mention must be made of the Confederación Latinoamericana de la Industria Gráfica (CONLATINGRAF).

It is the emphasis on information exchange among Latin American firms in the graphic arts that makes this an important link in the training situation common to most of these firms.

Formed in 1967 during the first Latin American Congress of the Graphic Industry in Mar de Plata, Argentina, the following objectives were stated:

1. Promote cultural development through printing.
2. Encourage the development of the graphic arts in all of Latin America.
3. Keep all its members informed about graphic arts topics concerning Latin America and that contribute knowledge and experience to the industry.
4. Promote the technical, scientific and social interchange among members.
5. Develop the education and preparation of skilled workers.
6. Advertise literature and equipment availability.[62]

Mexico was the site for the Second Congress of CONLATINGRAF in October 1969.

United Nations Organizations

Two organizations are involved in worldwide educational issues: the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Labor Organization (ILO).

UNESCO provides technical assistance in setting up communication systems at the request of developing countries.[63]

The ILO activities in the graphic arts field concern those related to the effect of technical change on training, labor organization and health issues. These issues are main topics during their Tripartite Technical Meetings held in Geneva, Switzerland; the first of these meetings involving the Printing and Allied Trades was held in 1962 and the second recently in 1981. Both of these meetings resulted in incisive reports on the status of the graphic arts throughout the world.

The ILO also undertakes projects in the area of vocational training in the graphic arts. One such project was the Graphic Arts Vocational Training Project in Venezuela, financed the the United Nations Development Program and executed by the ILO between 1972 and 1974. The project achieved the following objectives:

> 1. Training needs assessment for the different branches of graphic arts: training and upgrading of qualified manpower.
> 2. Development of programs for instructors and technicians: updating instructor training.
> 3. Organization and putting into operation of a laboratory for the quality control of graphic arts products with the following aims:
> (a) to aid enterprises in improving quality;
> (b) to train technicians through in-plant training;
> (c) to develop continual training for instructors;
> (d) to assist in setting up departments or sections for the preparation of graphic arts manuals.[64]

The establishment of joint tripartite vocational training boards is under active consideration in Mexico.[65]

Individual Establishments

> Public and private training centers, enterprises, independent colleges and universities, consultants, etc. These develop a great number of training activities that are not always officially regulated. Duplication of effort will probably persist and in most countries the picture is likely to remain complex and untidy.[66]

Technological Centers: Center for Technical Studies in the Graphic Arts in Queretaro

There is a great need in Mexico for workers with a good preparation on technical subjects; skilled and technical personnel are needed who have a background in photography, electronics, chemistry and mechanics.[67] This technical emphasis in education was incorporated in the curriculum of the Centro de Estudios Tecnológicos de Artes Gráficas Mexicano-Italiano No. 378/CETAGMI, located in the city of Queretaro, state of Queretaro.

Programs in this center are at the middle superior or technical level. This center was created through cooperation of the Mexican-Italian governments, with the Italian Association of Graphic Arts Machinery Manufacturers ACIMGA providing equipment and short-term italian instructors. The Mexican government provided the site for the school.[68]

The center is under the Dirección General de Educación Tecnológica Industrial and has the following objectives in its operation:

1. To impart technological education for the development of Professional Technicians in the Graphic Arts.
2. To aid and promote research for alternative technologies to fit the country's needs.
3. To instill and develop a feeling of service and social unity in both staff and student.
4. To optimize the use of human and fiduciary resources available in accordance to the national development plan.
5. To coordinate and to expand the access to its functions especially for students of limited resources.
6. To raise the quality of technical education.
7. To relate the education with the private, service and public sectors.

8. To preserve, conserve and implement culture.[69]

Three fields of study are offered, each lasting six semesters or three years:

> 1. Professional Technician in Photo Reproduction: a technician who possesses theoretical-practical knowledge to perform auxiliary functions in the graphic arts field in all related to the photographic requirements of reproduction.
> 2. Professional Technician in Rotogravure: a technician ... performing auxiliary functions in the rotogravure field and those related procedures for graphic impressions.
> 3. Professional Technician in Offset: a technician ... performing auxiliary functions in the graphic arts field and all procedures relating to offset and reproduction technologies.[70]

In 1981 there were more than 100 students enrolled, with the first graduating class completing training that year.[71]

Manufacturers/Suppliers Training

There are in Mexico long established training centers that offer excellent technical training to the graphic arts industry; these centers are manned and administered by firms involved in supplying equipment or process materials to the industry.[72]

The specialized and technical nature of their training has made their contribution limited to experienced and technical personnel, although classes in some centers are open to newcomers to the industry.

Some of the most respected training centers are the Centro de Capacitación Fotográfica Aplicada a las Artes Gráficas de Kodak Mexicana, S.A. de C.V. and the Du-Pont center, Centro de Capacitación Fotomecánica de Lito Accessorio. Other centers like Metalgamica S.A. Centro Técnico de Capacitación have recently commenced training of workers in the processing and handling of plates. Ink manufacturers also offer technical assistance (Sanchez y Co.).

Mexican printing businesses purchasing new equipment or technology complain frequently on the insufficient content and duration of training received from suppliers and manufacturers. The quality of training received is generally considered good, but shortcomings in length of training and larger context are often cited: "both European and U.S. suppliers offer to train a typist in the use of photocomposition equipment in two weeks, or a press operator in a matter of days. Such training has been found to be inadequate for Mexican labor."[73] The need for training operators in more troubleshooting and preventive maintenance procedures is often mentioned.[74] Current visits by salesmen are scarce and most information on new equipment is usually acquired by the potential buyer through his own initiative through foreign publications or by attending trade shows, usually abroad.[75]

Trade Shows, Exhibitions

Mexprint and Expografica are the two expositions held in Mexico, usually every two or three years, and aimed at the graphic arts industry. These trade shows are invaluable in the introduction and sale of new technology.[76]

Trade Publications

Numerous publications from the United States are received in Mexico. The value of these trade publications was deemed important by most subscribers and and interest exists in seeing more articles published on technical subjects, procedures and original graphic arts research findings.

Mesas Redondas (Technical Meetings)

It is important to note the presence of these informal groups and their contribution to the exchange of ideas, solutions and approaches to problems faced by participants in the day-to-day operation of their firms. These meetings are attended by owners, manufacturers, suppliers, technicians, skilled workers and all those sharing an interest in the graphic arts. Problems faced by participants are brought to the forum and possible solutions are offered; speakers may also expand on their particular area of expertise for the benefit of those present.

FOOTNOTES FOR CHAPTER 5

[1]U.S., Department of Commerce, DIB 80-03-505, op. cit., p. 22.

[2]U.S., Department of Commerce, International Trade Administration, Overseas Business Reports, Marketing in Mexico, International Marketing Information Series Pubn. No. OBR 81-09 (May 1981), p. 21.

[3]John F. H. Purcell, "Mexican Social Issues," in Mexico-United States Relations, ed. Susan Kaufman Purcell (New York: The Academy of Political Science, 1981), p. 44.

[4]Ibid., p. 45.

[5]U.S., Department of Commerce, Industry and Trade Administration, Overseas Business Reports, Investing in Mexico, International Marketing Information Series Pubn. No. OBR 79-13 (May 1979), p. 6.

[6]U.S., Department of Commerce, OBR 81-09, op. cit., p. 21.

[7]Thomas E. Weil, Area Handbook for Mexico (Washington, D.C.: Foreigh Area Studies of the American University, 1975), p. 45.

[8]U.S., Department of Commerce, OBR 81-09, op. cit., p. 21.

[9]Thomas E. Weil, op. cit., pp. 137-138.

[10]Hiram Harding Goad, "Vocational Education in the Federal Secondary Schools of Mexico" (Ph.D. dissertation, East Texas State University, 1973), p. 45.

[11]Ibid., p. 47.

[12]Ibid.

[13]Tom Delagnis, "The Development and Present Status of the Regional Technical Institutes in Mexico" (Ph.D. dissertation, East Texas State University, 1978), p. 25.

[14]Hiram Harding Goad, op. cit., p. 48.

[15]Tom Deliganis, op. cit., pp. 28-43.

[16]Secretaría de Educación Pública, "Estudios Técnico Industrial," México, D.F., 1982.

[17]U.S., Department of Commerce, DIB 80-03-505, op. cit., p. 12.

[18]Ibid., p. 13.

[19]United Nations, Report II 1981, op. cit., p. 27.

[20]Ibid., p. 28.

[21]Ibid., p. 29.

[22]U.S., Department of Commerce, DIB 80-03-505, op. cit., p. 15.

[23]Mario Ricardo Navarrete Agillar, "La Ingenieria Industrial en las Empresas de Artes Gráficas" (Thesis, Centro Nacional de Enceñanza Técnica Industrial, 1975), México, D.F., p. 49.

[24]U.S., Department of Commerce, DIB 80-03-505, op. cit., p. 14.

[25]United Nations, Report II 1981, p. 34.

[26]U.S., Department of Commerce, DIB 80-03-505, op. cit., p. 16.

[27]Centro de Capacitación y Adiestramiento para Trabajadores de Artes Gráficas, op. cit.

[28]Charles Dicks, "Training Methods Must Change to Meet Needs of the Future," Production Journal, January 1979, cited in International Labour Organization, Report II 1981, p. 34.

[29]Gilberto Rodríguez R., "Capacitación y Adiestramiento en la Industria de Artes Gráficas," Cámara Nacional de la Industria de Artes Gráficas, May-June 1981.

[30]United Nations, Report II 1981, p. 84.

[31]R. Johnson, "Education and Training in the 80's," Employment Gazette, November 1979, as cited in United Nations Report II 1981, pp. 84-85.

[32]Cámara Nacional de la Industria de Artes Gráficas, Directorio de Socios 1981 (Mexico, D.F.), p. 6.

[33]"Servicios Que Presta la Cámara Nacional de la Industria de Artes Gráficas a sus Asociados," Cámara Nacional de la Industria de Artes Gráficas, May-June 1981.

[34]Gilberto Rodríguez R., "Capacitación y Adiestramiento en la Industria de Artes Gráficas," Cámara Nacional de la Industria de Artes Gráficas, May-June 1981.

[35]Gilberto Rodríguez R., "Necesidad de Crear Conciencia Colectiva para Participar y Contribuir al Bien Comun en la Industria de las Artes Gráficas," Impresor Internacional, June 1981, p. 48.

[36]Centro de Capacitación y Adiestramiento para Trabajadores de Artes Gráficas, "Programa de Cursos Julio-Diciembre de 1981," Cámara Nacional de la Industria de Artes Gráficas, May-June 1981.

[37]Rodríguez, "Conciencia Colectiva," op. cit.

[38]Gilberto Rodríguez, "Capacitarse para Capacitar," Impresor Internacional, June 1981, p. 45.

[39]Baeza, "Comportamiento Obrero," op. cit., p. 58.

[40]Confederación Latinoamericana de la Industria Gráfica, Latingráfica 1. Guia Latinoamericana de la Industria (Montevideo, Uruguay, 1975), p. 78.

[41]Miguel Aguilera Lopez, "La Columna del Comandante Miguel Aguilera Lopez," Impresor Internacional, February 1982, p. 7.

[42]Unión de Industriales Litógrafos de México, A.C., Mexico, D.F.

[43]U.S., Department of Commerce, OBR 81-09, op. cit., p. 21.

[44]Baeza, "Comportamiento Obrero," op. cit., p. 146.

[45]U.S., Department of Commerce, OBR 79-13, op. cit., p. 7.

[46]Ibid, p. 6.

[47]Ibid.

[48]United Nations, Report II 1981, op. cit., p. 79.

[49]R. Johnson, "Training in the 80's," op. cit., p. 83.

[50]Baeza, "Comportamiento Obrero," op. cit., pp. 94-95.

[51]Ibid., p. 93.

[52]Ibid.

[53]Ibid.

[54]Rodríguez, "Capacitarse para Capacitar," op. cit., p. 45.

[55]Centro de Capacitación y Adiestramiento para Trabajadores de Artes Gráficas, "Programa," op. cit.

[56]Maria Guadalupe Ahuactizin Vasquez, "Acciones de Capacitación y Adiestramiento en la Industria de las Artes Gráficas," Impresor Internacional, April 1982, p. 59.

[57]United Nations, International Labour Organization, Special Problems in the Printing and Allied Trades in Developing Countries and the Adaptation of the National Labour Force to the Use of Imported Machinery and Equipment (Report II 1962), pp. 66-74.

[58]"CeNaPro-ARMO Apoya a la Empresa Pequeña y Mediana en el Incremento de su Productividad," Cámara Nacional de la Industria de Artes Gráficas, April-May 1982, pp. 43-44.

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[63]UNESCO to Build Graphic, Media Systems in Afghanistan, Honduras," World-Wide Printer, September-October 1977, p. 48.

[64]United Nations, International Labour Organization, General Report (Report I 1981), p. 87.

[65]United Nations, Report II 1981, p. 14.

[66]Ibid., p. 84.

[67]"Personnel Training Criteria: What they are, what they should be," Australasian Printer, October 1971, p. 21.

[68]W. P. Jaspert, "Printing Equipment Sales Follow Printing School Training," World-Wide Printer, May-June 1978, p. 50.

[69]"Centro de Estudios Tecnológicos de Artes Gráficas," Cámara Nacional de la Industria de Artes Gráficas, March-April 1981, pp. 24-25.

[70]Secretaría de Educación Pública, "Técnicos Profesionales para el Sector Industrial y de Servicios," Guia de Carreras (Mexico, D.F., 1980), pp. 216-225.

[71]Cámara Nacional, "Centro de Estudios Tecnológicos," op. cit., p. 24.

[72]Rodríguez, "Capacitación y Adiestramiento," op. cit.

[73]U.S., Department of Commerce, DIB 80-03-505, op. cit., p. 59.

[74]Ibid., p. 118.

[75]Ibid., p. 128.

[76]Ibid., p. 118.

CHAPTER 6

SUMMARY OF FINDINGS AND CONCLUSIONS

FINDINGS THROUGH DIRECT ENQUIRY

Firms in Mexico were contacted through lists provided by the National Chamber of the Graphic Arts in Mexico and by the Graphic Arts Technical Foundation in the United States. Questionnaires combining multiple choice and essay questions were sent to 54 firms. The reply rate was 28 percent. A questionnaire sample and tabulation of replies are included in the Appendix.

Respondents' fields of operation involved publishing (53 percent), commercial printing (47 percent), packaging (13 percent) and other (27 percent). Respondents' operation included two or three separate areas in some cases.

Size of firms surveyed range from small (1-49 workers) and medium size (50-199 workers) to large firms of 200 or more employees.

The questionnaire was used for determining the following: (1) existing training/educating facilities in Mexico; (2) availability of training through firms surveyed; (3) acquisition of new technology and problems encountered in training of personnel; (4) determination of other means and methods being used in the industry for the exchange of technical information; (5) the need for a centralized technical and training center in Mexico.

Existing Training Facilities in Mexico (Questions 14 and 15).

In determining the existence and extent of training and educational facilities in Mexico, 93 percent of respondents agreed that existing facilities could be improved; when asked if their workers had access to training/educating facilities, 60 percent answered positively; 40 percent indicated a lack of access.

A sampling on the needs of present facilities and programs revealed the following recommendations by respondents:

1. A larger number of vocational/technical schools on the bachillerato (middle-superior) level are needed to meet the training needs of the graphic arts industry.
2. A more comprehensive primary and secondary general education is needed to improve preparation of workers.
3. A more intensive approach to capacitation should be followed by existing training centers; except for some highly technical training offered by suppliers training centers, most others concentrate on a basic, elementary approach to training.
4. Recruitment for some jobs within the graphic arts industry is being done from other universities and training institutes without a graphic arts program.

Recommendations made by respondents toward improving the training programs of existent centers included the following:

1. Enlargement of existing courses with more active participation of technicians as instructors.
2. Systematic supervision of training and capacitation given.
3. Investigation of problems indigenous to the graphic arts industry of Mexico.
4. Creation of more seminars, with increased use of teaching aids like audio-visuals.
5. More resources should be allocated by industry and government to training activities.

Training through Firms Surveyed (Questions 4 through 7).

Of firms surveyed, 87 percent admitted having some type of training program for their workers. Of this figure only 23 percent

acknowledged having a "continuous" training program with 38.5 percent respectively having only "periodical" and "only when needed" training programs.

Training through firms involved on the majority (73 percent) on-the-job training; this training was in most cases accompanied by other training aids such as books, manuals and audio-visuals. One large firm created and controlled the manufacture of their own audio-visuals and other training materials.

Most of the audio-visuals in use were judged to be of good quality and valuable teaching aids; a need for more and revised audio-visuals was expressed.

Some of the self-critical comments on the firms' training programs and their needs were:

1. More training equipment to allow theory and practice to combine.
2. More continuity of firm's training program with more seminars offered by other institutions; more access by workers to training centers outside the firm.
3. More books and teaching materials written in "appropriate" Spanish. It was felt that the language used in some existing books is confusing and not colloquial enough to be understood by users.

New Technology and Training Problems (Questions 8 through 12, 20).

Firms acquiring new equipment encountered transition problems, especially those related to manufacturer/supplier initial training.

Initial training on new equipment was largely the responsibility of the manufacturer/supplier and only 17 percent of firms polled indicated they complement that training with their own. Comments on the quality of initial training were by large on the negative side, with

duration and limited content being the main deficiencies; firms purchasing substantial equipment (web press, computer) were pleased with the training given with duration again being found wanting.

Problems encountered when training personnel on new equipment were:

1. Obtaining books, manuals, programs or courses for technicians involved.
2. Low educational background of workers, especially lack of theoretical knowledge needed to understand new equipment.
3. Lack of skilled personnel to operate computerized equipment, particularly phototypesetting, to capacity.
4. Lack of awareness of personnel for quality and waste control.

The training problems just mentioned denote the lack of preparation of workers to assimilate new technology and processes and it only intensifies the problems faced by the manufacturer/supplier when initiating training on new equipment; the following recommendations made by buyers toward improving initial training should help in this respect:

1. Manufacturers should have qualified and experienced personnel in charge of training.
2. More preventive maintenance procedures should be covered during actual training period, not only operation of machine.
3. Initiate longer training periods based on the Mexican reality of its workforce; let historical experience be the guide when designing initial training.
4. Regarding the writing and preparation of manuals: manuals must be written in Spanish, with colloquial usage of language considered; illustrate with abundant use of photos and drawings; review and clarify language on complex topics; standardize size of manuals.

Technological Exchange - Means Being Utilized (Questions 17 through 19).

Of surveyed firms, 100 percent indicated receiving trade and technical publications to aid them in acquiring information on new technology. These publications were viewed as being an important complement

to information exchange, particularly in learning about new technology, procedures and materials.

Trade publications originating in the United States were by far the most numerous.

Readership of publications consisted mainly of technical personnel (60 percent), administrators (33 percent); only in a small number of firms were these publications available to all personnel (20 percent).

Suggestions for improving the content and benefit to readers were as follows:

1. More technical information and articles dealing with new procedures, techniques.
2. More coverage of specific areas such as photomechanics, platemaking, etc.
3. More publication of original research done on different printing processes.
4. More critical articles on equipment in use, with fair critiques on advantages and disadvantages of usage.

A Centralized Technical and Training Center in Mexico? (Question 21).

The idea of a centralized technical center and the need for such a center to combine training and technological transfer was deemed important by 100 percent of the respondents.

Asked to expand their views on what functions or services this center could encompass, the following comments were made:

1. Capacitation of personnel for the graphic arts industry, including skilled workers, technicians and supervisory personnel.
2. Offer courses of topics related to the technological reality of the graphic arts industry in Mexico.
3. Establish short training courses on specific areas of semi-skilled, skilled trades, with no long training periods involved.
4. A single organization to which to Mexican industry could resort with specific problems without having to contract foreign technical consultants.
5. Create solutions to problems of the industry in Mexico.
6. Adapt training techniques and teaching aids for the use of small and medium industries.

FINDINGS THROUGH FIELD AND LITERATURE RESEARCH

1. Theoretical, rather than technical, emphasis is being incorporated into new training schemes. ("Groups Involved in Training/Educating Activities," pp. 37-43).

2. The problem of appropriate technology remains real in Mexico; its large labor force requires a labor-intensive approach to employment, but new technology being purchased encourages reduction of work force. ("Technological Transfer," pp. 24, 27).

3. Training for instructors is limited. Aid in upgrading and updating skill for instructors is needed from industrial or other sectors. ("Groups Involved in Training/Educating Activities," pp. 37-43).

4. Duplication of effort exists in training programs. Integration of miscellaneous programs offered by training centers could aid in this area. ("Groups Involved in Training/Educating Activities, pp. 37-43).

5. There is a need for more technical centers for the graphic arts equipped with modern machinery where a theoretical-practical approach could be instituted. ("Individual Establishments," pp. 50, 51; "Classification of Training Needs," pp. 33-37).

6. Some redundancy is taking place in the area of letterpress as more firms change over to offset lithography. Nevertheless, letterpress continues to exist and will continue in use for some time to come. ("Technological Transfer," pp. 24, 27).

CONCLUSIONS

The following conclusions were derived from this study:

1. More in-depth studies are needed to determine the adaptation of existing training systems to: (1) the changing content and level of skill of existing occupations; (2) the disappearance and creation of occupations; (3) retraining needs of the industry; (4) present and future employment opportunities in the industry.

2. Coordination of training programs offered through organizations involved in capacitation may be possible through the direction and leadership of involved government bodies like the UCECA.

3. In updating the training of instructors, plans for technical/educational visits (pasantias) by instructors to industrialized countries should be developed. Length of visit would depend on area of training and background of instructor.

4. There is a need for more technical and descriptive exchange of training programs in existence in industrialized countries. These programs would prevent precious resources from being used to develop similar materials.

5. Evaluation techniques for judging effectiveness of training programs must be elaborated and applied conscientiously to determine capacitating value.

6. The United States graphic arts manufacturing sector could aid in the setting up and equipping of new technical centers in Mexico. The benefits of these centers would include the training of skilled

personnel to run and be familiar with United States equipment and also improved sales for manufacturers.

7. The general education system in Mexico must play a larger role in the preparation of the active work force by providing more intensive training and developing more vocational alternatives.

8. Training courses by suppliers/manufacturers must be revised and be made relevant to the educational background of Mexican workers.

9. Further investigations should be initiated on the effects of technological transfer in Mexico, particularly in the areas of job redundancy, trade union relations and the fear of technological dependency.

APPENDIX

TABULATION OF RESULTS FOR DIRECT ENQUIRY QUESTIONNAIRE TO 15 GRAPHIC ARTS FIRMS IN MEXICO

Question No.	Question	No. of Replies*	Percentage of Replies**
1.	Main specialties or products of company:		
	(a) Commercial Printing	7	47
	(b) Publishing	8	53
	(c) Packaging	2	13
	(d) Other	4	27
2.	Number of workers:		
	(a) 1-24	2	13
	(b) 25-49	1	7
	(c) 50-99	3	20
	(d) 100-199	2	13
	(e) 200-399	2	13
	(f) 400 or more	5	34
3.	Do you export to other Latin American Countries?		
	(a) Yes	4	27
	(b) No	11	53
4.	Do you maintain your own system of training for your workers?		
	(a) Yes	13	87
	(b) No	2	13
	Is your system?:		
	(a) Continuous	3***	23***
	(b) Periodical	5	38.5
	(c) Only when needed	5	38.5
5.	Are your training programs directed to?:		
	(a) Skilled and semi-skilled . . .	10	67
	(b) Technicians	9	93
	(c) Administrators	6	40

*Replies from the respondents may include more than one choice for some questions.

**Based on total number of respondents (15), unless otherwise noted.

***Based on 13 respondents indicating own system.

Question No.	Question	No. of Replies	Percentage of Replies
6.	What teaching methods are used in your training system?		
	(a) On-the-job training	11	73
	(b) Books and Manuals	4	27
	(c) Presentation Audio-Visual . . .	10	67
	(d) Other	1	7
	In your opinion, what improvements could be introduced in your system to make training more effective?	N/A	N/A
	What is the quality of the books and manuals used in your system?:		
	(a) Clear and easily understood . .	4	27
	(b) Could be more up-to-date . . .	2	13
	(c) Inadequate	1	7
	What is your opinion about the use of obtainable audio visuals in your program?	N/A	N/A
7.	Please, indicate specific problem areas in the training of your employees:		
	(a) Sheetfed Presses	N/A	N/A
	(b) Web Presses	N/A	N/A
	(c) Stripping/Plates	N/A	N/A
	(d) Composition	N/A	N/A
	(e) Computers	N/A	N/A
	(f) Cameras, Scanners	N/A	N/A
	(g) Other areas	N/A	N/A
8.	Have you acquired new systems or equipment lately?		
	(a) Yes	12	80
	(b) No	3	20
	What type of system or equipment?		
	(a) Sheetfed Press	7	47
	(b) Web Press	3	20
	(c) Camera	--	--
	(d) Computer	3	20
	(e) Composition Equipment	2	13
	(f) Other	4	27

Question No.	Question	No. of Replies	Percentage of Replies
9.	What was the main reason for acquisition of this new equipment/system?		
	(a) Increase in jobs	3*	25*
	(b) Equipment replacement	3	25
	(c) New capacity and specialization	6	50
	(d) Other	--	--
10.	Have your workers had additional training in the new equipment?		
	(a) Yes	12	100*
	(b) No	--	--
	If additional training was received, how was it performed?		
	(a) Our own training	2	17*
	(b) By the manufacturer/ representative	10	83
	(c) Other	--	--
11.	If training was offered by the manufacturer/representative, what was its quality?	N/A	N/A
	If the training, in your opinion, was not effective, what are your recommendations in that regard?	N/A	N/A
12.	Do you have technical information available through manufacturers/ representatives regarding operation and repair of equipment/ system?		
	(a) Yes	13	87
	(b) No	2	13
	Are manuals for operation and repair written in clear and logical manner?		
	(a) Yes	12	80
	(b) No	3	20
	What improvements, if any, could be introduced in these manuals?	N/A	N/A

*Based on 12 respondents previously indicating purchases of new equipment.

Question No.	Question	No. of Replies	Percentage of Replies
13.	In your opinion, which are the most important objectives in your firm?		
	(a) Greater volume	3	20
	(b) More quality	14	93
	(c) Speed of production	7	47
	(d) Less process waste	6	40
14.	Do your workers have access to other forms of technical/vocational education?		
	(a) Yes	9	60
	(b) No	6	40
	What type of education?		
	(a) Technical/vocational institutes	8	53
	(b) Technical organizations	10	63
	(c) Correspondence courses	--	--
	(d) Technical visits to other countries	--	--
	(e) Other	2	13
15.	Are the educational/vocational facilities in your city or country?:		
	(a) Adequate for our needs	1	7
	(b) Could be improved	14	93
	What improvements, in your opinion, could be of benefit in training personnel for the graphic arts industry?	N/A	N/A
16.	What number of your employees have finished?:		
	(a) High School	*	*
	(b) Vocational schools		
	(c) University studies		
	(d) Specialized studies		
17.	Do you receive publications or magazines related to the graphic arts?		
	(a) Yes	15	100
	(b) No	--	--
	Name of Publications:	N/A	N/A

*Results from this question were not consistent with previous answers given by respondents, specifically No. 2; results were judged inconclusive.

Question No.	Question	No. of Replies	Percentage of Replies
	Are these publications available to?:		
	(a) All employees	3	20
	(b) Administrative personnel only .	5	33
	(c) Technical personnel	9	60
	Are these publications, in your opinion, the best manner of obtaining up-to-date technical information?		
	(a) Yes	8	53
	(b) No	7	47
	What specific information is most useful when received through these magazines/publications?	N/A	N/A
18.	Is your firm a member of a technical organization/association in the graphic arts field?		
	(a) Yes	15	100
	(b) No	--	--
	Name of those organizations:	N/A	N/A
	What type of services or technical help is offered by these organizations?		
	(a) Training courses	10	67
	(b) Technical information	7	47
	(c) Plant audits	4	27
	(d) Other services	--	--
19.	In your opinion, are the activities of these organizations?:		
	(a) Of great importance	8	53
	(b) Of some importance	6	40
	(c) Of little importance	1	7
	In what way could these organizations be of greater help to the industry?	N/A	N/A
	What sort of educational activities, initiated by these organizations, would aid the most in the training of personnel?	N/A	N/A

Question No.	Question	No. of Replies	Percentage of Replies
20.	In your opinion, new technology developments in the graphic arts:		
	(a) Cause problems in training and are not understood by our workers due to lack of educational materials	13	87
	(b) Do not cause problems; our training and educational facilities are adequate	2	13
21.	In your opinion, would it benefit the graphic arts industry in your country to have a Latin-American technical organization serving as a technical center for information and training?		
	(a) Yes	15	100
	(b) No	--	--

FORMULARIO DE INVESTIGACIÓN DE TESIS

La Industria de las Artes Gráficas en America Latina:
sus Requisitos Educacionales y de Entrenamiento

Esta investigación se dirige a la industria gráfica en Latino-America, especialmente a los requisitos de la industria en cuanto a la educación y entrenamiento de su personal. Se espera que los resultados de este estudio sean de beneficio en descubriendo necesidades educacionales y en la creación de programas efectivos de entrenamiento. Gracias por su ayuda en esta investigación.

Por favor llene el formulario y devuelvalo a:

Orbe A. García
Thesis Research Project
140 Woodland Dr.
Concord, N.C. 28025

Nombre de la empresa_____

1. Principales productos o especialidades: ☐Trabajos comerciales ☐Publicaciones (libros, revistas, periodicos, etc.) ☐Enbalajes, envases ☐Otro:_____
   _____

2. Numero de empleados: ☐1-24 ☐25-49 ☐50-99 ☐100-199 ☐200-399 ☐400 o más

3. ¿Exporta a otros paises Latino-Americanos? ☐Si ☐No
   Pais, o paises, de mayor exportación:_____

4. ¿Mantiene su propio sistema de educación y entrenamiento para sus empleados?
   ☐Si ☐No ¿Es su sistema?: ☐Continuo ☐Periodico ☐Solamente cuando necesario

5. ¿Son sus programas de entrenamiento dirigidos a?:
   ☐Obra de mano ☐Empleados técnicos ☐Empleados de administración

6. ¿Que metodos de enseñanza son usados en su sistema de entrenamiento?:
   ☐Entrenamiento en el equipo mismo ☐Libros y manuales ☐Presentación audio-visual ☐Otro (por favor, indique)_____
   _____

   En su opinion, ¿que mejoras podrian ser introducidas en su sistema para obtener un entrenamiento mas efectivo?_____
   _____
   ¿Cual es la calidad de los libros y manuales usados en su sistema?: ☐Claros y facil de comprender ☐Podrian ser mas al dia ☐Inadecuados
   ¿Cual es su opinion en el uso de audio-visuales en el entrenamiento de empleados?
   _____
   ¿Cual es la calidad y cantidad de audio-visuales obtenibles hoy día para sus programas?:
   _____
   _____

7. Por favor, indique áreas y problemas especificos del entrenamiento de sus empleados:

☐ Manejo de imprentas de pliego.....Problemas_____
☐ Manejo de imprentas de bobinas.....Problemas_____
☐ Empalme de planos/preparacion de planchas.....Problemas_____
☐ Manejo de equipo de composición (foto o metal)..Problemas_____
☐ Manejo de computadoras.....Problemas_____
☐ Manejo de camaras, "scanners," etc. en la separación de colores.....Problemas_____
☐ Otras áreas_____Problemas_____

8. ¿Ha adquirido nuevo equipo o sistemas ultimamente? ☐ Si ☐ No
¿Que clase de equipo o sistema?:

Maquina impresora de pliegos.....De fabricación_____
Maquina impresora de bobinas.....De fabricación_____
Cámara gráfica.....De fabricación_____
Computadoras.....De fabricación_____
Equipo de composición grafica.....De fabricación_____
Otro_____De fabricación_____

9. ¿Cual fué la razón principal en la adquisición de este nuevo equipo/sistema?

☐ Aumento de trabajos ☐ Obtener nueva capacidad y especialización
☐ Reemplazo de equipo ☐ Otra_____

10. ¿Han tenido sus empleados entrenamiento adicional en este nuevo equipo?

☐ Si ☐ No
Si tuvieron entrenamiento adicional, ¿de que manera fue ejecutado?

☐ Nuestro propio entrenamiento
☐ Entrenamiento ofrecido por el fabricante/representante
☐ Entrenamiento por organización técnica
☐ Otro_____

11. Si ofrecido por fabricante/representante, ¿cual fué en su opinion, la calidad de este entrenamiento?_____

Si el entrenamiento, en su opinion, no fue efectivo, cuales serian sus recomendaciones:_____

12. ¿Tiene a su alcance información técnica acerca de la operación y reparo de equipo y sistemas a travez del fabricante/representante y las compañias sumistradoras de productos para las artes gráficas? ☐ Si ☐ No

¿Son los manuales de operación y reparo escritos de manera clara y lógica?

☐ Si ☐ No

¿Que mejoras, si alguna, podrian ser introducidas en estos manuales?_____

13. En su opinion, ¿cual de estos objetivos le es de más importancia a su empresa?

☐Mayor volumen ☐Más calidad en los trabajos ☐Rapidez de los trabajos
☐Menos gastos en la tirada

14. ¿Tienen acceso sus empleados a otras formas de educación técnica/vocacional?

☐Si ☐No

¿Que otra forma de educación?

☐Instituto técnico'vocacional.....Nombre_____
☐Organizacion técnica.....Nombre_____
☐Cursos de correspondencia.....A través de_____
☐Pasantia fuera del pais.....A través de_____
☐Otro_____Nombre_____

15. ¿Son las facilidades educacionales/vocacionales en su ciudad o pais?

☐Adecuadas para nuestros requisitos ☐Podrian ser mejoradas
¿Que mejoras o cambios, en su opinion, serian de beneficio en el entrenamiento de personal para la industria gráfica?_____
_____
_____

16. ¿Que numero de su empleados han terminado?

_____Escuela secundaria (bachillerato) _____Escuelas o institutos vocacionales

_____Estudios universitarios _____Estudios especializados

Por favor indique si el número de empleados en los ultimos tres años han:

☐ Aumentado ☐Disminuido

17. ¿Recibe usted publicaciones o revistas relacionadas con las artes gráficas?

☐Si ☐No
Nombre de Publicación_____ _____
_____ _____
_____ _____

¿Son estas publicaciones puestas al alcance de?
☐Todos los empleados ☐Solo empleados de administracion ☐Empleados técnicos

¿Son estas revistas, en su opinion, la mejor manera de obtener información técnica al dia? ☐Si ☐No

¿Que clase de información en particular le es de mas beneficio cuando recibida por medio de estas revistas, publicaciones?_____
_____
_____

18. ¿Pertenece su empresa a organizaciones o asociaciones técnicas referente a las artes gráficas? ☐Si ☐No

Nombre de las organizaciones:
En mi pais:_____ En el extranjero_____
_____ _____
_____ _____

18. Con't.

¿Que clase de servicios o ayuda técnica es ofrecida por estas organizaciones?

☐ Cursos de entrenamiento Organización_____
☐ Información técnica Organización_____
☐ Auditoria de talleres Organización_____
☐ Otros servicios_____
_____Organización_____

19. En su opinion, ¿son las actividades de estas organizaciones?
☐ De gran importancia para el desarrollo de la industria gráfica en Latino America
☐ De alguna importancia
☐ De poca importancia

¿De que manera podrian esta organizaciones ser de mayor ayuda a la industria?___
_____
_____

¿Que clase de actividades educacionales, iniciadas por estas organizaciones, le seria de ayuda en el adiestramiento de su personal?_____
_____

20. En su opinion, los avances técnicos en las artes gráficas:
☐ Causan problemas de entrenamiento y no son entendidos por nuestros empleados debido a la falta de materiales educacionales
☐ No causan problemas; nuestro adiestramiento y facilidades educacionales son adecuadas

21. En su opinion, ¿seria de beneficio a la industria gráfica en su pais el tener una organización técnica Latino-Americana sirviendo como centro técnico de información y adiestramiento? ☐ Si ☐ No

¿De que manera especifica le podria servir tal organización a su empresa y a la industria gráfica en su pais?_____
_____
_____

¿Le gustaria recibir una copia de los resultados de esta investigación?

☐ Si ☐ No

Enviar a: Nombre_____puesto_____

22. Comentarios adicionales. Por favor, desarrolle, si necesario, cualquier tema anterior para el cual no tuvo suficiente espacio. (Indique, por favor, el numero de la pregunta):

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